

Cellular and Molecular Biology, Block 1 Weekly Formative Questions
Week 3 (September 4-September 7, 2012)

Maltese - Lipids 1: Beta Oxidation

1. The enzyme that utilizes coenzyme A as one of its substrates in the beta oxidation cycle of fatty acids is
 - A. acyl dehydrogenase.
 - B. enoyl-CoA hydratase.
 - C. L-hydroxyacyl-CoA dehydrogenase.
 - D. thiolase.

2. You have prescribed a parenteral liquid dietary formulation for a patient in the ICU who is unable to consume solid food. One of the lipid components of the formulation is listed as oleate. Which of the following terms describes the same lipid?
 - A. cis,cis- $\Delta^{9,12}$ -octadecadienoate
 - B. cis- Δ^9 -hexadecenoate
 - C. n-hexadecanoate
 - D. cis- Δ^9 -octadecenoate
 - E. n-tetradecanoate

Maltese - Lipids 2: Fatty Acid Synthesis

3. During synthesis of fatty acids, which of the following compounds is consumed?
 - A. beta-ketoacyl-CoA
 - B. acetoacetate
 - C. fatty acyl-CoA
 - D. NADPH
 - E. FADH₂

4. The enzyme reaction catalyzed by acetyl-CoA carboxylase
 - A. produces butyryl-CoA.
 - B. is inhibited by phosphorylation of the enzyme.
 - C. requires oxaloacetate.
 - D. requires NADPH.
 - E. is inhibited by aggregation of the enzyme.

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Dr. Crissman - Cartilage and Joints

5. Select the **CORRECT** statement about cartilage.
- A. Only fibrocartilage contains reticular fibers in large amounts.
 - B. Aggrecan is a large glycoprotein responsible for holding large amounts of water within it to give the cartilage matrix the ability to resist compression.
 - C. Cartilage is typically avascular due to the large amount of water present in the extracellular space.
 - D. Mast cells are typically found migrating through the extracellular matrix of hyaline cartilage.
 - E. One would expect to find brown adipocytes within the cartilage matrix of patients with hypercellular obesity.
6. Select the **CORRECT** statement about cartilage.
- A. During cartilage repair of articular cartilage, there is a large amount of interstitial growth due to the proliferation of the chondrocytes immediately adjacent to the cartilage fracture.
 - B. The elbow joint is an example of a synchondrosis.
 - C. The intervertebral disc is an example of a cartilaginous joint.
 - D. Rheumatoid arthritis is a degenerative disease that is due to the loss of the proteoglycan component of the articular cartilage.
 - E. All fibrous joints are either diarthroses or amphiarthroses.

Dr. Crissman - Bone Tissue

7. Select the **CORRECT** statement.
- A. The osteogenic layer of the periosteum is an example of interstitial growth.
 - B. Sharpey's fibers act to hold the periosteum to the bone tissue and attach tendons or ligaments to bone.
 - C. Osteoclasts are responsible for the deposition of new bone tissue.
 - D. Internal remodeling is completed (stops) in the fifth decade when osteoporosis becomes noticeable.
 - E. Tropocollagen molecules of type II collagen fibers can initiate calcification.

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8. Select the **CORRECT** statement.
- A. The only function of bone lining cells is to separate bone tissue from bone marrow.
 - B. The bone matrix is completely mineralized within 3-4 days of the start of the mineralization process.
 - C. Interstitial lamellae are formed from circumferentially lamellae only.
 - D. The cement line is the last part laid down in the forming osteon.
 - E. Parathyroid hormone will stimulate the osteoclasts to resorb bone matrix, which results in increased blood calcium levels.

Dr. Crissman - Bone Development

9. Select the **CORRECT** statement about bone formation.
- A. Androgens (sex hormones) prevent the calcification of the hyaline cartilage matrix.
 - B. In major fractures, both endochondral and intramembranous growth occur.
 - C. Intramembranous ossification only occurs in the flat bones of the skull.
 - D. The internal callus formed during bone repair is the result of proliferation of osteoprogenitor cells by the endosteum.
 - E. The osteoprogenitor cells in the perichondrium that forms the boney collar were reticular cells before they differentiated into osteoprogenitor cells.
10. Select the **CORRECT** statement.
- A. Bone modeling is the continuing process of replacing old bone tissue with new bone tissue throughout life.
 - B. Osteoporosis is the slow accumulation of non-mineralized osteoid in the older individual.
 - C. Sex hormone (androgens and estrogen) have no known effect on the epiphyseal plates of adolescent children.
 - D. The zone of ossification in the epiphyseal plate is where woven, spongy bone is being formed.
 - E. Intramembranous ossification only occurs in the frontal and parietal bones of the skull.

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Dr. Chiaia - Muscle 1

11. Smooth muscle cells
- A. contain actin and myosin.
 - B. are multinucleate structures.
 - C. both A and B.
 - D. neither A nor B
12. Which statement(s) is(are) **CORRECT** regarding skeletal muscle?
- A. The perimysium is a connective sheath which surrounds individual muscle fascicles.
 - B. The Z-lines bisect I-bands, thus defining the sarcomeres.
 - C. Both A and B are correct.
 - D. Neither A nor B is correct.

(See next page for answers)

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Instructor	Question	Answer
Dr. Maltese	1	D
	2	D
	3	D
	4	B
Dr. Crissman	5	C
	6	C
	7	B
	8	E
	9	D
	10	D
Dr. Chiaia	11	A
	12	C